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SUBJECT: DRAFT DUST ACTION LEVELS FOR PARCEL G, HUNTERS POINT SHIPYARD, SAN FRANCISCO, CALIFORNIA.

PCA: 14718 Site: 200050-47 EnviroStor #WR20056383

DOCUMENT REVIEWED AND BACKGROUND: HERO was asked to develop dust action levels for community air monitoring for Parcel G, Hunters Point Naval Shipyard, San Francisco, California by the DTSC Project Manager, Nina Bacey. HERO received the request on February 20, 2019.

SCOPE OF REVIEW: To address concern regarding potential contaminated dust to any nearby residents and visitors during the forthcoming excavation at Parcel G and per the request of the DTSC Project Manager, HERO calculated acute, subchronic and chronic dust action levels as PM_{10} (particulate matter 10 micrometers or less in diameter) for community air monitoring. The action levels were calculated for the following chemicals: benzo(a)pyrene, arsenic, chromium hexavalent, cobalt, and manganese. HERO's calculated dust action levels, the rationale and method of our calculation is discussed below in this memorandum.

DEVELOPMENT OF RISK-BASED DUST ACTION LEVELS

HERO calculated the following dust action levels: 1) an acute (4-hour) dust action level for arsenic; 2) subchronic (8-hour) dust action levels for arsenic, chromium VI (particulates), and manganese; and 3) chronic dust action level for benzo(a)pyrene and cobalt. The results were reported then as PM_{10} action levels. Ideally HERO would have calculated acute dust action levels for all chemicals of concern; however, an acute toxicity criterion is only available is for arsenic. To calculate the dust action levels, HERO used the maximum detected soil concentration at Parcel G provided by the DTSC Project Manager. The soil concentrations used are listed below in Table 1.

The Bay Area Air Quality Management District (BAAQMD) regulatory limit for total PM_{10} (uncontaminated and contaminated particulates) is 50 µg/m^3 (http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status).

HERO used the acute (4-hour) and subchronic (daily 8-hour) reference exposure level (RELs) from the Office of Environmental Health Hazard Assessment (OEHHA) for arsenic (0.2 µg/m^3 and 0.015 µg/m^3, respectively), and OEHHA subchronic REL for manganese (0.17 µg/m^3). HERO used the Agency for Toxic Substances and Disease Registry (ATSDR) intermediate (15 to 364 days) minimal risk level (MRL) for chromium VI (0.03 µg/m^3). For cobalt, HERO used the chronic ATSDR inhalation MRL (0.1 µg/m^3). For benzo(a)pyrene, HERO used the USEPA chronic reference concentration (RfC) (2E-03 µg/m^3).

Acute Calculations

For the acute evaluation, the PM_{10} action level is calculated by dividing the chemical-specific REL by the metal concentration in soil as shown below:

$$PM10\ Action\ Level\ \left(\frac{ug\ dust}{m3}\right) = \frac{Acute\ (REL)\frac{ug}{m3}\ x\ Conversion\ factor\ (1E{-}03\frac{mg}{ug})}{Soil\ Concentration\left(\frac{mg\ chemical}{kg\ soil\ or\ dust}\right) \times Conversion\ Factor\ (1E{-}9\ kg/ug)}$$

Subchronic and Chronic Calculations

For the subchronic and chronic evaluation, the PM_{10} action level is calculated by the following equation:

$$PM10\ Action\ Level\ \left(\frac{ug}{m3}\right) = \frac{Subchronic\ or\ Chronic\ REL, RfC, MRL\ \left(\frac{ug}{m3}\right)\ x\ Conversion\ factor\ (1E-03\frac{mg}{ug})}{Soil\ Concentration\ \left(\frac{mg}{kg}\right) \times Conversion\ Factor\ \left(1E-9\frac{kg}{ug}\right)} \times \frac{24\ hours}{8\ hours} \times \frac{7\ days}{5days}$$

During the excavation, exposure to respirable dust could occur for 40 hours per week (8 hours per day for 5 days per week) for approximately 5 months.

The PM_{10} action levels are shown in Table 2.

Table 1. Soil Concentrations.

Chemical of Concern	Maximum Soil Concentration (mg/kg)
Arsenic	24
Benzo(a)pyrene	0.3
Chromium VI	4.9
Cobalt	383
Manganese	8770

Table 2. PM_{10} Dust Action Levels.

Chemical of Concern	Action Levels Based on Maximum Detected Soil Concentration		
	Acute Dust Action Level ($\mu g/m^3$)	Subchronic Dust Action Level ($\mu g/m^3$)	Chronic Dust Action Level ($\mu g/m^3$)
Arsenic	8.3E+03	2.6E+03	--
Benzo(a)pyrene	--	--	2.8E+04
Chromium VI	--	2.6E+05	--
Cobalt	--	--	1.1E+03
Manganese	--	8.1E+01	--

"--" = Toxicity Criteria not available and a dust action level could not be calculated.

CONCLUSIONS

HERO calculated acute, subchronic and chronic dust action levels as PM_{10} for the soil excavation at Parcel G, Hunters Point Shipyard for arsenic, benzo(a)pyrene, chromium VI (particulates), cobalt and manganese. The calculated action levels for contaminated dust are above the BAAQMD regulatory limit for total PM_{10} of 50 $\mu g/m^3$ as shown in Table 2. **Therefore, compliance with the BAAQMD regulatory limit 50 $\mu g/m^3$ for total PM_{10} would be protective for all chemicals found in soil at Parcel G.**

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